#04. 다음 삼각함수의 값을 덧셈정리를 이용하여 계산하라.

덧셈정리 불필요!! 굳이 쓰자면…

(1) $\cos\frac{4}{3}\pi$

$= \cos(\pi+\frac{\pi}{3}) = \cos\pi\cos\frac{\pi}{3} - \sin\pi\sin\frac{\pi}{3}$

$= -\frac{1}{2} - 0 = -\frac{1}{2}$

(2) $\sin\frac{\pi}{3} = \frac{\sqrt{3}}{2}$ $\quad \sin(\frac{\pi}{6}+\frac{\pi}{6}) = \sin\frac{\pi}{6}\cos\frac{\pi}{6} + \cos\frac{\pi}{6}\sin\frac{\pi}{6}$.

#05. $\sin x = \frac{1}{3}$, $\sin y = \frac{3}{5}$, 다음 삼각함수의 값을 구하라. $0 \le \pi \le \frac{\pi}{2}$, $\frac{\pi}{2} \le y \le \pi$ 이다. (→ x 이겠죠? ↓ x)

(1) $\sin(x+y) = \sin x\cos y + \cos x\sin y$

상각함수 덧셈정리 이용. $\sin^2 x + \cos^2 x = 1$ 공식사용 $\frac{1}{9} + \cos^2 x = 1$

$\cos^2 x = \frac{8}{9}$, $\cos x = \pm\frac{2\sqrt{2}}{3}$ $0 \le x \le \frac{\pi}{2}$에의해 $\cos x = \frac{2\sqrt{2}}{3}$ Good!

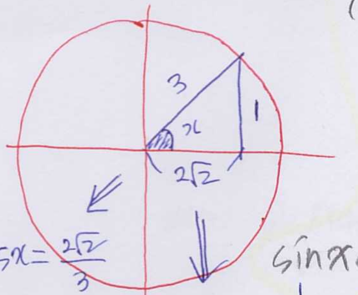
$\sin^2 y + \cos^2 y = 1$. $\frac{9}{25} + \cos^2 y = 1$. $\cos^2 y = \frac{16}{25}$, $\cos y = \pm\frac{4}{5}$

$\frac{\pi}{2} \le y \le \pi$에의해 $\cos y = -\frac{4}{5}$ Good!

$\sin x\cos y + \cos x\sin y = \frac{1}{3}\times(-\frac{4}{5}) + \frac{2\sqrt{2}}{3}\times\frac{3}{5} = \frac{-4}{15} + \frac{6\sqrt{2}}{15}$

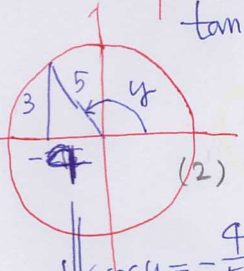
$= \frac{6\sqrt{2}-4}{15}$.

더 쉬운 방법



$\cos x = \frac{2\sqrt{2}}{3}$

$\tan x = \frac{1}{2\sqrt{2}}$



$\cos y = -\frac{4}{5}$

$\tan y = -\frac{3}{4}$

(2) $\tan(x-y) = \frac{\tan x - \tan y}{1+\tan x\tan y} = \frac{\frac{1}{2\sqrt{2}} - (-\frac{3}{4})}{1+(\frac{1}{2\sqrt{2}})(-\frac{3}{4})} = \frac{\frac{1}{2\sqrt{2}} + \frac{3}{4}}{1 - \frac{3}{8\sqrt{2}}}$

덧셈정리이용

$\tan x = \frac{\sin x}{\cos x} = \frac{\frac{1}{3}}{\frac{2\sqrt{2}}{3}} = \frac{1}{2\sqrt{2}}$. $\tan y = \frac{\sin y}{\cos y} = \frac{\frac{3}{5}}{-\frac{4}{5}} = -\frac{3}{4}$

$\frac{\frac{1}{2\sqrt{2}} + \frac{3}{4}}{1 - \frac{3}{8\sqrt{2}}} = \frac{\frac{4+6\sqrt{2}}{8\sqrt{2}}}{\frac{8\sqrt{2}-3}{8\sqrt{2}}} = \frac{(4+6\sqrt{2})(8\sqrt{2}+3)}{(8\sqrt{2}-3)(8\sqrt{2}+3)} = \frac{32\sqrt{2}+12+96+18\sqrt{2}}{128-9}$

$= \frac{50\sqrt{2}+108}{119}$.